

COUNCIL FOR SCIENCE AND TECHNOLOGY

ANNUAL REPORT FOR 2000-01

Introduction

1. This is the second annual report of the Council for Science and Technology, covering its work over the period from 1 April 2000 to 31 March 2001.

2. Following its re-establishment in March 1998 with new terms of reference, the Council serves as the Prime Minister's top level, independent advisory body on strategic issues concerning Science and Technology (S&T) in the U.K. It is charged with taking a medium to longer term, proactive approach to its core task of keeping under review and making recommendations on ways of improving:

(a) the performance of the U.K (Public and Private) in S&T, in relation to current and future national needs and opportunities;

(b) the overall impact of the funding arrangements for publicly supported S&T including those for research in higher education institutions;

(c) the effective use and exploitation of S&T by business, Government and the public services to create wealth and improve our quality of life, and;

(d) the synergy between the U.K's domestic and international S&T activities and the scope for the U.K to get more benefit from S&T collaboration.

Additionally, the Council provides advice on particular strategic issues of national importance whenever sought by the Government.

3. The Council presently comprises 15 independent members:

Mr Javid Aziz (*Chief Executive, Aspective Limited*);

Mr Euan Baird (*Chairman, Schlumberger Ltd*);

Professor S Kumar Bhattacharyya CBE FEng (*Professor of Manufacturing Systems, University of Warwick*);

Professor Sir Alec Broers FRS FEng (*Vice Chancellor, University of Cambridge*);

Professor Vicki Bruce OBE (*Deputy Principal Research and Professor of Psychology, University of Stirling*);

Professor Sir Christopher Evans OBE (*Chairman, Merlin Ventures*);

Professor Julia Higgins CBE FRS (*Professor of Polymer Sciences, Imperial College of Science, Technology & Medicine*);

Dr Rob Margetts CBE FEng (*Chairman, Legal & General plc and Chairman (Europe) Huntsman Corporation*);

Sir Paul Nurse FRS (*Director, Imperial Cancer Research Fund*);

Dr David Potter CBE (*Chairman, Psion plc*);

Miss Emma Rothschild CMG (*Director, Centre of Economic History, University of Cambridge*);
Professor Peter Schuddeboom;
Sir Richard Sykes DSc FRS (*Chairman, GlaxoSmithKline plc and Rector of Imperial College of Science, Technology & Medicine*);
Professor David VandeLinde (*Vice Chancellor, University of Bath*); and
Mr John Weston CBE (*Chief Executive, BAe Systems plc*).

4. As an “Advisory, Non-Departmental Public Body”, the Council operates in accordance with the framework for “Opening Up Quangos” which the Government established in 1998. In accordance with this framework, it publishes its advice, details of its meetings, work and membership¹. It has also adopted a code of practice based on the seven principles of public life, the “Nolan” standards of selflessness, integrity, objectivity, accountability openness, honesty, and leadership.

Summary

5. During 2000-01, the Council met quarterly on 5 June, 25 September and 4 December 2000, and 5 March 2001 to:

- follow up its 1998/99 reports: *Science Teachers; Technology Matters; and S&T activities across Government*²;
- undertake new [pro-active] work on the following topics: *Arts and Humanities in relation to Science & Technology; the Quinquennial Review of the six grant funding Research Councils; and the new science and innovation strategies being prepared by Government Departments*;
- provide advice on a number of other aspects of the Government's S&T policies and activities, including the Government's *Spending Review 2000*³, the Science and Innovation White Paper, *Excellence and Opportunity*⁴, the 6th EU Framework Programme for Research, Technology and Development⁵, and the Government's international S&T activities outside the EU.;
- put in hand preparatory work for its next programme in 2001-02 on the topics of *the Science Base and the Services Industries; the Education and Training of Research Post Graduates; and Higher Education*;

6. The year was one of considerable change, progress and development, during which the Government responded formally to the Council's three 1998-99 reports⁶ and

¹ The Council's web site contains this and other information, including the register of interests declared by member at the address www.cst.gov.uk.

² Copies of these reports are available on the Council's web site at www.cst.gov.uk.

³ *Spending Review 2000 - New public Spending Plans for 2001 to 2004: Prudent for a Purpose, Building Opportunity and Security for All*. Available on HM Treasury's web site at www.HM-Treasury.gov.uk.

⁴ *Excellence and Opportunity a science and innovation policy for the 21st century* Cm 4814. Available on the Department of Trade & Industry's web site at www.dti.gov.uk.

⁵ The UK's position paper is available on the web site of the Office of Science & Technology at www.dti.gov.uk/OST.

⁶ These responses are also available on the Council's web site at www.cst.gov.uk.

introduced new policies and measures in line with the recommendations in these reports.

7. The year also saw a number of changes in the Council's membership:

- Sir Aaron Klug, Dame Bridget Ogilvie, Sir Robin Nicholson, Professor Sir Stewart Sutherland and Mr Martin J Taylor stood down after many years of outstanding service;
- Mr Javaid Aziz, Mr Euan Baird, Professor Vicki Bruce, Sir Paul Nurse, Professor Peter Schuddeboom, Professor David VandeLinde and Mr John Weston were appointed as new members with a three year term;
- Sir Richard Sykes and Professor Kumar Bhattacharyya were re-appointed for a further three year term; and
- Professor David King succeeded Sir Robert May as the Government's Chief Scientific Adviser, and, hence, as deputy chair of the Council.

Follow Up Work

(a) Science Teachers

8. At its meeting on 4 December 2000, the Council received an initial response to this report from the Department for Education and Employment (DfEE)⁷. Among the important matters covered by this response were:

- the new performance management arrangements which have been introduced into schools for reviewing and appraising teachers annually;
- the National College for School Leadership; and
- the National Grid for Learning;
- the new initiative on science at key stage 3 which has just started its pilot phase;
- DfEE's work on a new, national strategy for teachers continuous professional development, published subsequently in March 2001: and
- Science Year 2001.

9. In view of the vital importance of school science to the nation's future prosperity and well being, the Council is pleased to note that the Government is also taking a number of other significant steps to raise school standards and effectiveness.

10. These steps include new financial incentives for attracting graduates into the science teaching profession; new schemes of work for science at key stages 2 and 3; a

⁷ Ibid 6

further review of the national science curriculum by the Qualifications and Curriculum Authority (QCA) to ensure that it meets the needs of the 21st century; and an agenda for better science which was presented in the *Excellence and Opportunity* White Paper⁸.

11. This White Paper contained a specific commitment by the Government to work with the Council and science teachers in considering further steps to support their professional development including those recommended in this report. Since then, the Council has:

- participated in a consultation conference on 1 November 2000 with secondary science teachers, in partnership with the DfEE, the General Teaching Council and the Association for Science Education (ASE);
- provided evidence to the Science & Technology Committee of the House of Lords during its short, follow up inquiry into Science and Schools; and
- continued to work closely with DfEE and OST officials in the preparations for an investigative study during 2001 into the proposals that are presented in this report for establishing a "centre of excellence" to support and help science teachers.

12. In this further work, the Council will be taking full account of the conclusions and recommendations in the report by their Lordships' S&T Committee, which was published on 21 March 2001⁹.

(b) Technology Matters

13. Since publishing this report in March 2000, the Council has noted with approval the extensive range of new measures which the Government has subsequently introduced to promote and improve the UK's productivity and innovation. Generally, these measures are closely aligned with the report's conclusions and recommendations for bringing about a step change in the exploitation of S&T by UK businesses and which focused on the key assets of successful high growth companies, namely people, technology, finance and sponsorship in the widest sense.¹⁰

14. More especially, the Government set out its strategy for Science and Innovation in the 21st century in the *Excellence and Opportunity* White Paper of 26 July 2000.¹¹ The strategy is aimed at:

- maintaining and enhancing the excellence of the science base, through significant new investment in modernising the research infrastructure, and in key areas of research: genomics, e-science and such basic technology as nano-technology, quantum computing and bioengineering;

⁸ Ibid 4

⁹ *Science in Schools*: HL Paper 38. Also available at web site address www.publications.parliament.uk.

¹⁰ Ibid 2 & 6.

¹¹ Ibid 4" available on the DTI web site at www.dti.gov.uk

- opening up opportunities for innovation and interaction between universities and business, and encouraging effective exploitation of new technologies, for instance through the Higher Education Innovation Fund, , further Faraday Partnerships and centres of excellence, new Regional Innovation Funds, and the Small Business Research Initiative;
- ensuring that people have a confident relationship with science by creating a strong and robust, transparent framework for science, for which the Government acts in the roles of investor, facilitator and regulator.

15. Building on this strategy, the Government announced further policy developments on 13 February 2001 to help individuals, communities and businesses to prosper in this fast changing world. Entitled *Opportunity for all in a world of change*,¹² this White Paper on Enterprise, Skills, and Innovation was aimed at

- improving skills, abilities and know-how;
- building prosperous regions and communities;
- investing in innovation
- fostering enterprise; and
- strengthening european and global connections

16. Significant, additional, measures were also contained in Budget 2000 and Budget 2001.¹³ In the latter, the Council was particularly pleased to note the Government's intentions to:

- take forward all the recommendations by Mr. Paul Myners, Chairman of Gartmore Investment Management, in his review of institutional investment in the UK;
- commission an independent study into the supply of highly skilled scientists and engineers, particularly those with postgraduate qualifications, led by Sir Gareth Roberts; the study should be completed by February 2002;
- introduce a new tax incentive to encourage R&D among larger firms and launched a consultation on its design ;
- publish for further consultation, detailed proposals about a new regime for providing relief to companies for the costs of intellectual property, goodwill and other tangible assets;
- extend the benefit of the capital gains tax business assets taper to employees of non trading companies, with effect from 6 April 2000;
- improve the All-Employee Share Ownership Plan (AESOP) to support employer's efforts to foster a more productive and enterprising relationship with their

¹² Cm 5052. Available on the the Department of Trade & Industry's web site at www.dti.gov.uk

¹³ Available on HM Treasury web site at www.HM-Treasury.gov.uk. Budget 2000 - *Prudent for a Purpose: Working for a Stronger and Fairer Britain*. Budget 2001 - *Investing for the Longer Term: Building Opportunity and Prosperity for all*.

workers, by introducing a stamp duty exemption for employees buying shares through an AESOP trust;

- expand the Enterprise Management Incentive Scheme by abolishing the limit on the number of beneficiary employees and by doubling the total value of share options to a £3million per company limit;
- streamline further the operation of the Enterprise Investment Scheme, the Venture Capital Trust Scheme and the Corporate Venturing Scheme, which provide tax incentives for investment in smaller, higher risk trading companies; and
- reduce the regulatory and compliance costs for small businesses and enhance the overall support available to them from the Inland Revenue in the light of responses to consultative proposals for a radical simplification of the way in which small businesses are required to calculate the tax due on their profits.

17. In welcoming and supporting all these policy developments, the Council still considers that the chief test is whether they will prove sufficiently powerful to achieve the intended step change in performance of UK businesses in innovation generally and in science & technology based innovation more particularly. As shown most recently in the second edition of *the UK Competitiveness Indicators* and the Government's new consultation paper on *Increasing Innovation*,¹⁴ redressing the comparatively lower levels of investment by the UK private sector in R&D - and particularly in research to generate knowledge and capabilities on which to found future, profitable business - remains a formidable challenge from all viewpoints.

(c) S&T Activities across Government

18. At its meeting on 25 September 2001, the Council welcomed and endorsed the Government's Plan for implementing the recommendations in this report. This plan, which was published on 26 July 2000 with the Science and Innovation White Paper and follows from the Government's initial response to this report in September 1999,¹⁵ accepts and sets out the steps that are being taken to execute the report's recommendations, namely that departments should:

- recognise, at ministerial level, the central role that S&T plays in Departmental policy formulation, decision taking and executive action;
- develop a more forward looking and strategic approach, identifying the outcomes from science and technology that they need to deliver their objectives and targets;
- improve their connections and communications with each other, with relevant research councils, and with opposite numbers internationally;

¹⁴ Published by the DTI in February 2001, this new edition of UK Competitiveness Indicators is available on its web site at www.dti.gov.uk. The consultation paper on *Increasing Innovation* is available on the Budget 2001 pages of the HM Treasury web site at www.hm-treasury.gov.uk.

¹⁵ The initial response and the Implementation Plan are reproduced on the Council's web site at www.cst.gov.uk

- appoint officials to take responsibility for ensuring that the department has the right mix of staff in-house, as well as the right external sources, to make sure that the department can deliver sound support on science and technology to Ministers including advice on the use of science in policy making.
- take stock of the implications of changes in career opportunities in the Civil Service for people with expertise in science and technology, resulting from privatisations of the research establishments;
- consider the need for a more coherent approach to the use of science and technology in industrial sponsorship;
- initiate a searching review of the European Framework Programmes for research collaboration at the earliest possible stage in development of thinking about the next Framework Programme (FP6), to identify ways to improve its value to departments and other UK users.

19. The Council will be keeping these matters under periodic review during the course of its future programmes of work.

New Work

(i) *Departmental Science and Innovation Strategies.*

20. At its meeting of 4 December 2000, the Council established a sub-group with the aim of:

- assisting Departments to prepare these new strategies in accordance with the recommendations specified in the report of the review of S&T activity across Government; and
- advising the Interdepartmental Ministerial Science Group (MSG) accordingly when it meets to review these strategies in Spring 2001, as scheduled in the Implementation Plan.

21. The sub-group, led by Sir Richard Sykes and comprising Dr Rob Margetts, Professor Sir Christopher Evans, Mr John Weston and Professor Peter Schuddeboom, has reviewed drafts by Departments and is preparing its advice to the Prime Minister and the MSG. This advice will be published in due course later during 2001 and Departments will be publishing their strategies before the summer recess 2001.

(ii) *The Quinquennial Review of the Research Councils*

22. This review, the first since the Research Councils were re-established in 1994, was formally announced by the Government on 13 February 2001¹⁶. Previously, the

¹⁶ Details are available on the web-site of the Office of Science and Technology (OST) at www.dti.gov.uk/ost.

Council had responded openly¹⁷ to a consultative letter of 30 October 2000 from the Office of Science and Technology (OST).

23. At present, a sub-group of members, led by Professor Julia Higgins and comprising Professor Sir Alec Broers, Professor Kumar Bhattacharyya, Sir Paul Nurse and Professor David VandeLinde, is preparing the Council's further advice for the second stage of the review, which is scheduled to run until summer 2001. This advice, which will be published in due course, is likely to focus on overarching issues concerning the distinctive roles and missions of the Councils and the OST

(iii) The Arts and Humanities in relation to Science and Technology

24. Since June 2000, another sub-group has been working on this topic, under the leadership of Ms Emma Rothschild and comprising Professor Vicki Bruce, Dr David Potter and Mr Javaid Aziz.

25. Following an initial, 3 month scoping study, the sub-group has been focusing its work on the following areas:

- The Education System_ - how well does the education system, and the basic curriculum at the various levels (GCSE, A level and university), fit people to cross the arts-science divide or to mix science with arts and humanities subjects ? Are students and researchers dissuaded from attempting to do so by their institutions ? Does the system discriminate against those who attempt it ? Are such candidates more or less attractive to employers ? What could be done, recognising existing constraints, to improve matters ?
- Research Funding Structures - how well do the present arrangements encourage inter-disciplinary research falling at the arts/science divide ? What could be done to make the arrangements work better ? How do other countries compare ?
- Communications - what more could be done by the Government to strengthen the links between the research and teaching communities in these disciplines., particularly those in higher education ?

26. The sub-group is intending to present a final report for the Council's consideration and approval at CST's next meeting on 4 June 2001. Once agreed and submitted, this report will be published in accordance with the Council's normal practice.

(iv) Student Subject Choice at Advanced GCSE and Undergraduate Level.

27. The Council is undertaking an analysis from available data sources to identify and gauge any significant trends and changes in the flows of students through post 16 secondary education into full time undergraduate study that have occurred since the first cohort completed key stages 3 and 4 of the National Curriculum in 1993/94.

¹⁷ This response is available on the Council's web site at www.cst.gov.uk.

28. The analysis is aimed at revealing the key features and patterns of these flows, across all subjects and main disciplines forming the arts-science spectrum. It will cover the population of students, aged between 18-20 years old on 31 August immediately before they commenced their undergraduate studies; came from schools, colleges and other (secondary) educational establishments within the UK, and had least 1 A level in any subject. And it will be conducted using the records of the Universities and Colleges Admissions Service (UCAS) over the period 1994/95 to 1999/2000, the most recent academic year for which data is available,.

29. The initial, headline results should be ready in time for the Council's next meeting on 4 June and the complete set will be published once the analysis has been completed with the support and agreement of UCAS.

Future Work

30. Looking ahead to its next programme of work, commencing later in 2001, the Council has asked the Secretariat to prepare proposals for a study into the question of what more the Government should do to strengthen the links between the Science Base and the Services Industries.

31. These industries are of growing importance to the UK's GDP, employment and international trade and investment and it is therefore essential that these links are sufficiently developed and effective in such sectors such as financial services, education, transport and distribution. The Council is intending to explore these matters more fully, possibly by undertaking some representative case histories as a basis for producing more generally applicable conclusions.

32. The Council has further agreed in principle that this next work programme should cover two other fresh topics, the **education and training of research post-graduates**, and **higher education**. It is intending to commence work on these as and when its existing work permits, and after taking full account of the study into the supply of highly skilled scientists and engineers by Sir Gareth Roberts for the Chancellor of the Exchequer and the Secretaries of State for Trade & Industry and for Education & Employment..

33. Finally, during 2001-02, a fresh round of appointments to the Council is due be made in accordance with the requirements of the Office of the Commissioner for Public Appointments.

*CST Secretariat
April 2001*